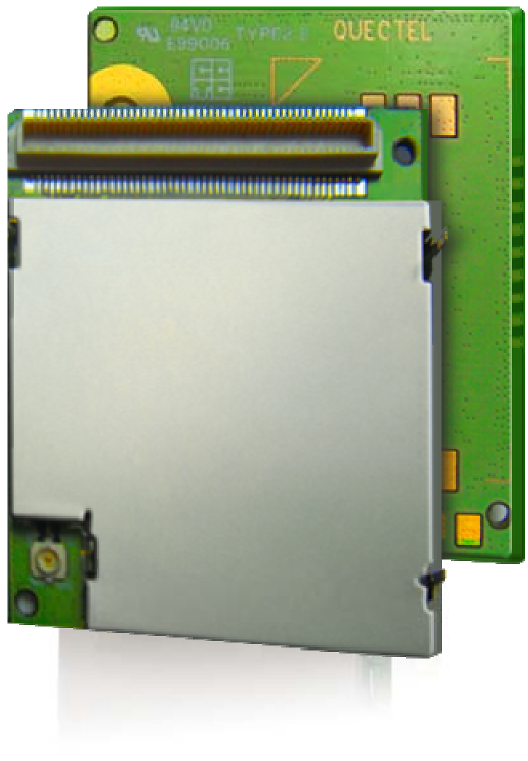
M33

Quectel Cellular Engine



EVB User Guide

M33_EVB_UGD_V1.0

Document Title	M33 EVB User Guide
Version	1.0
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Status	Release
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General Notes

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0. Revision History

Revision	Date	Author	Description of change
1.0	2010-06-28	Roy Chen	Initial

1. Introduction

This document defines and specifies the usage of M33 EVB.

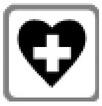
1.1. Related Documents

Table 1: Related documents

SN	Document name	Remark
[1]	M33_ATC	AT commands set
[2]	GSM_UART_AN	GSM UART port application notes
[3]	M33_HD	M33 hardware design document
[4]	Upgrade_FW_Tools_UGD	User guide of firmware upgrade tool
[5]	M33_Camera_ATC	M33 AT Command set for camera function

1.2. Safety Caution

The following safety precautions must be observed during all phases of the operation, e.g. usage, service or repair of cellular terminal incorporating M33 module. Manufactures of the cellular terminal is recommended to pass the following safety information to users, operating personnel. If customer fails to do so, Quectel couldn't bear any liability for customer's failure to comply with these precautions.



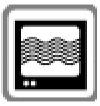
When in a hospital or other health care facility, observe the restrictions about the use of mobiles. Switch the cellular terminal or mobile off, medical equipment may be sensitive to RF interference.



Switch off the cellular terminal or mobile before boarding an aircraft. The operation of wireless equipment in an aircraft is forbidden to prevent interference to communication system. Failing to think enough of these instructions could lead to endanger flight safety or offend against local legal action, or both.



Do not operate the cellular terminal or mobile in the presence of flammable gas or fume. Switch off the cellular terminal when you are near petrol station, fuel depot, chemical plant or anywhere blasting operation is in progress. Operation of electronic equipment in potentially explosive atmosphere could constitute a safety hazard.



Cellular terminal or mobile receives and transmits radio frequency energy while switched on. RF interference could occur if it is close to TV set, radio, computer or other electronic equipments.



Road safety comes first! Do not use a hand-held cellular terminal or mobile while driving a vehicle, unless it is securely mounted in a holder for hands-free operation. Park the vehicle before making a call with a hand-held terminal or mobile.



GSM cellular terminals or mobiles operate over radio frequency signal and cellular network and cannot be guaranteed to connect in all conditions, for example no mobile fee or an invalid SIM card. While you are in this condition and need emergent help, Please Remember using emergency call. In order to make or receive call, the cellular terminal or mobile must be switched on and in a service area with adequate cellular signal strength.

Some networks do not allow for emergency call if certain network services or phone features are in use (e.g. lock functions, fixed dialing etc.). You may have to deactivate those features before you can make an emergency call.

Also, some networks require that a valid SIM card be properly inserted in cellular terminal or mobile.

2. EVB Kit Introduction

2.1. EVB Top and Bottom View

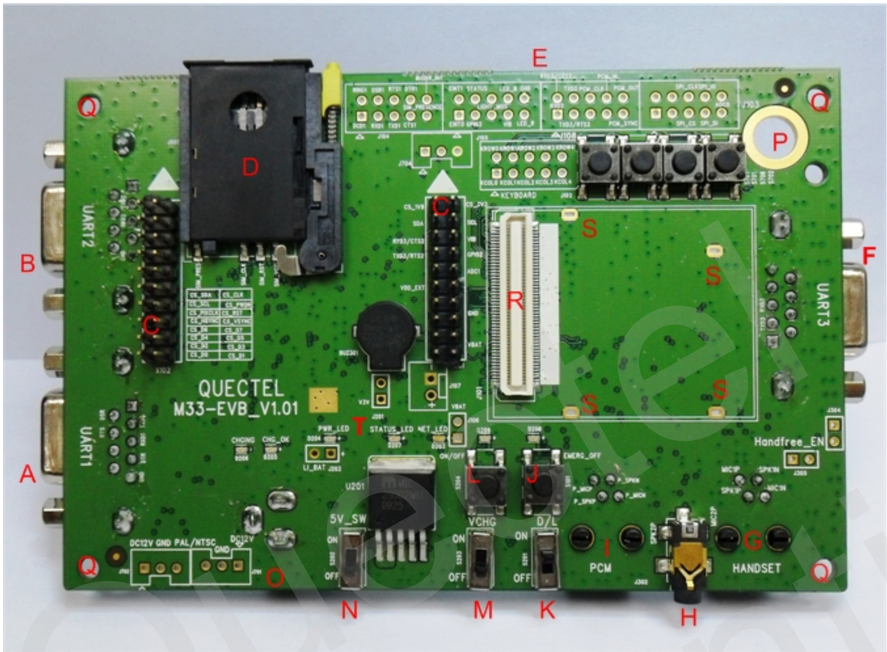


Figure 1: EVB top view (Uninstall M33-TE board)

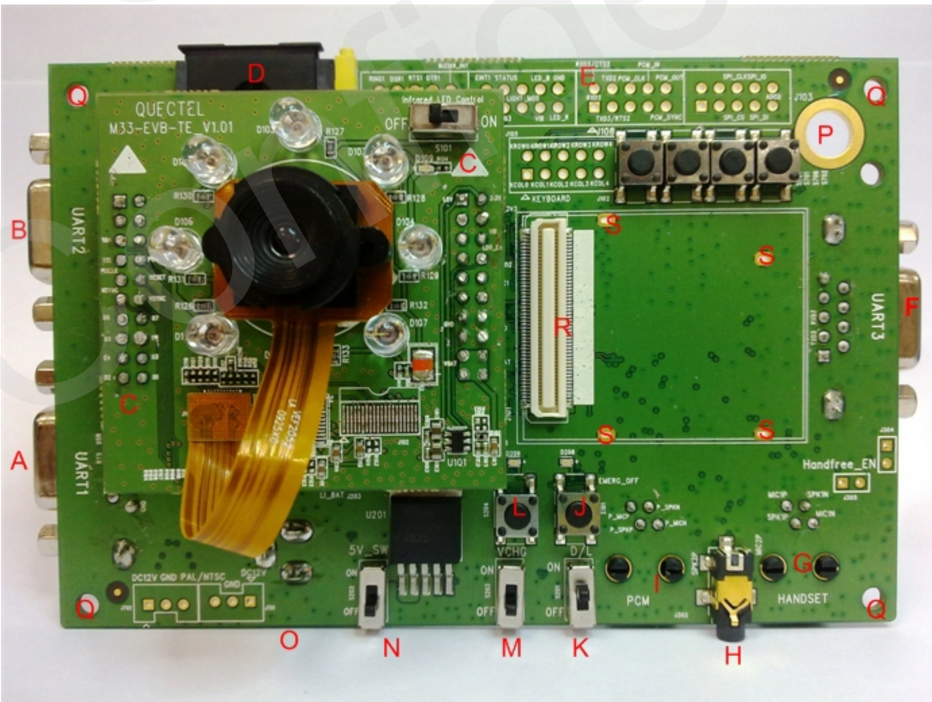


Figure 2: EVB top view (Installed M33_EVB_TE board)

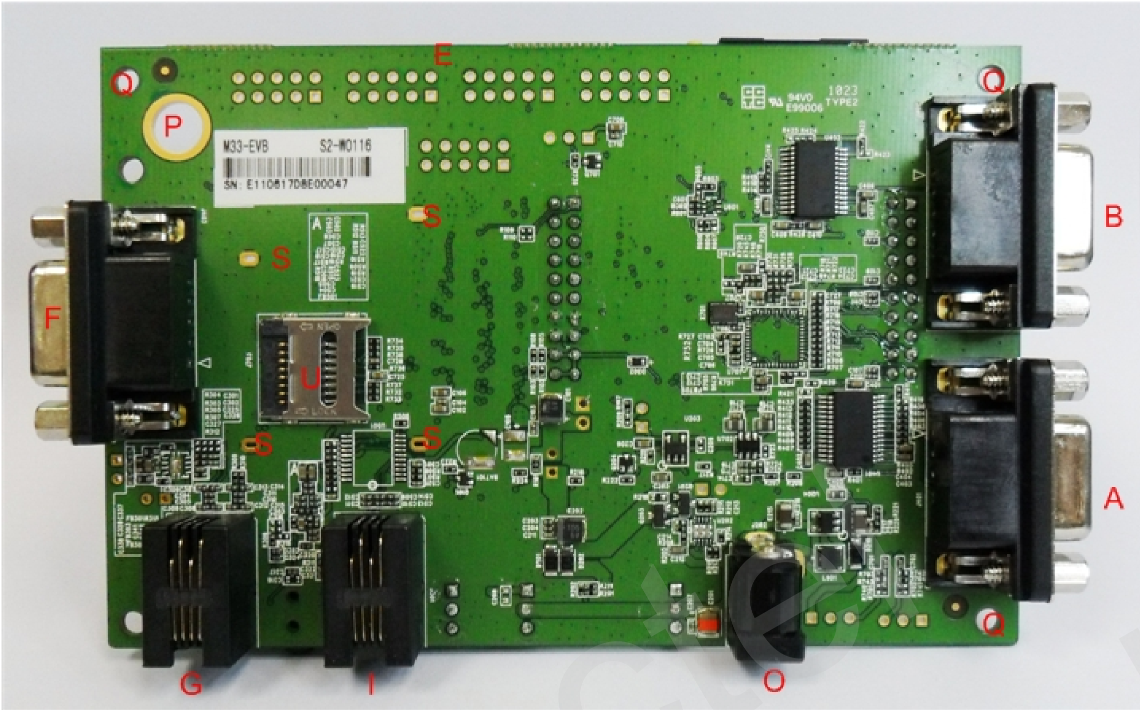


Figure 3: EVB bottom view

A: Serial Port 1
B: Serial Port 2
C: M33_EVB_TE Board interface (with indication mark)
D: SIM card socket
E: Test points
F: Serial Port 3
G: Handset socket of audio channel 1
H: Headset socket of audio channel 2
I: Handset socket of PCM channel
J: EMERG_OFF button
K: Download switch
L: ON/OFF button
M: VCHG switch
N: 5V power switch
O: Power adapter interface
P: Antenna connector fixing hole
Q: Screw holes for EVB placement
R: Board-to-board connector for M33 module
T: Module operating status indication LEDs
S: Four GND holes for soldering the shielding pins of M33 module
U: Micro SD-Card socket

2.2. EVB Accessories

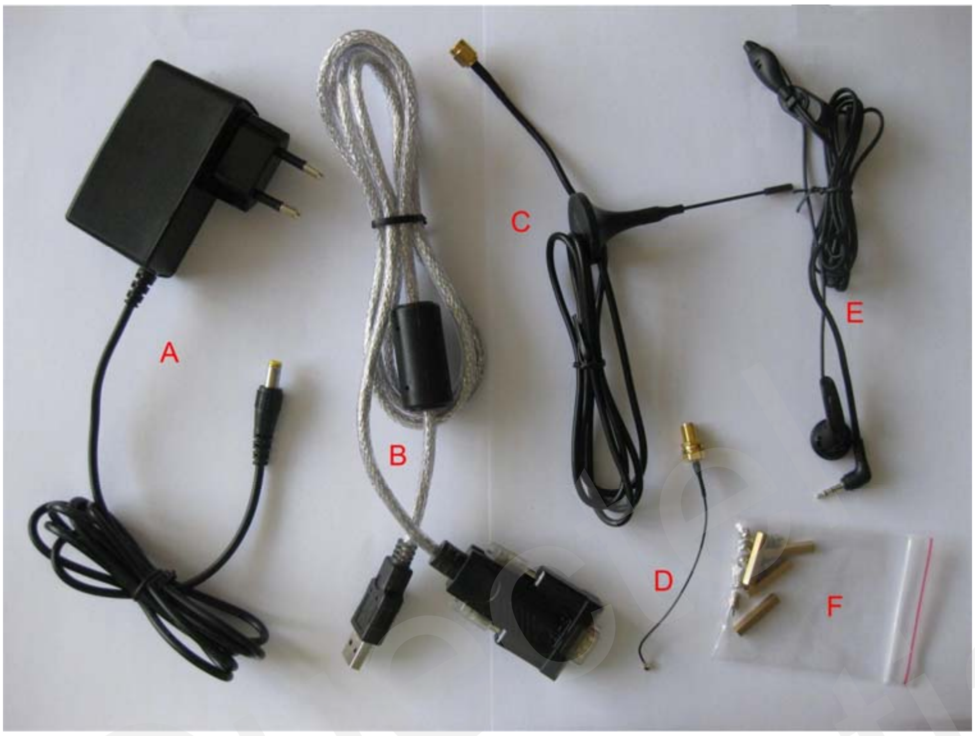


Figure 4: Accessory introduction

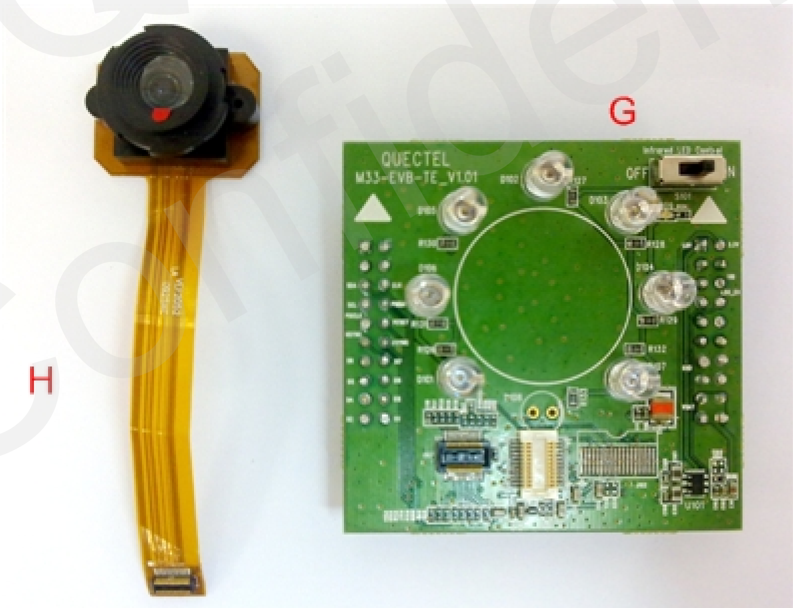


Figure 5: M33 EVB TE Board Accessory introduction

A: 5V DC switching power supply
B: USB to UART converter cable
C: Antenna
D: RF cable

E: Headset
F: Screws for EVB placement
G: M33 EVB TE Board
H: Recommended camera module (OV7725 sensor, part number: CN003VEF2052 from Global Optics Limited)

Note: Contact information of the camera module vendor is as follows:
Global Optics Limited
E-mail: shanghai@globaloptics.cn
http://www.globaloptics.cn

3. Interface Application

3.1. Power Interface

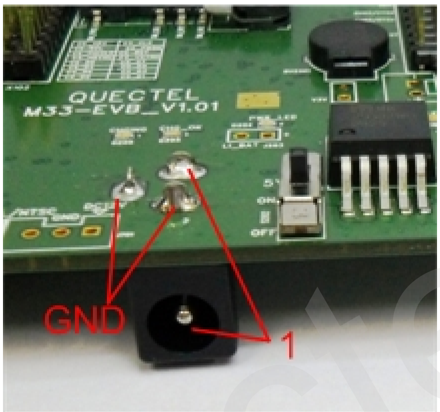


Figure 6: Power interface

Table 2: Pin of power interface

Pin	Signal	I/O	Description
1	Adapter input	I	**5V/2.5A** DC source input

3.2. Audio Interface

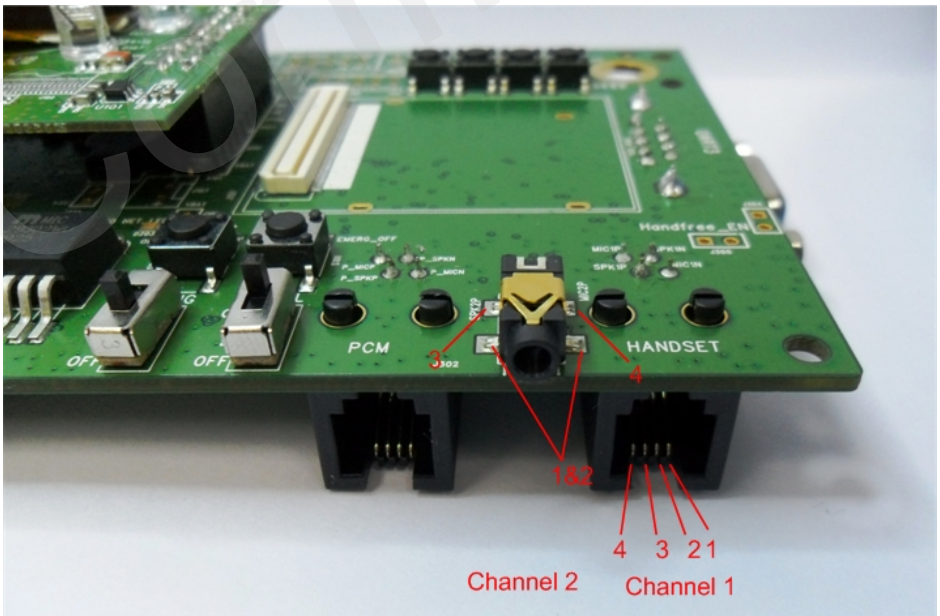


Figure 7: Audio interface

Table 3: Pins of audio channel 1

Pin	Signal	I/O	Description
1	MIC1N	I	Negative microphone input
2	SPK1N	O	Negative receiver output
3	SPK1P	O	Positive receiver output
4	MIC1P	I	Positive microphone input

Table 4: Pins of audio channel 2

Pin	Signal	I/O	Description
1	AGND		AGND of audio circuits
2	AGND		
3	SPK2P	O	Positive receiver output
4	MIC2P	I	Positive microphone input

3.3. SIM Card Interface

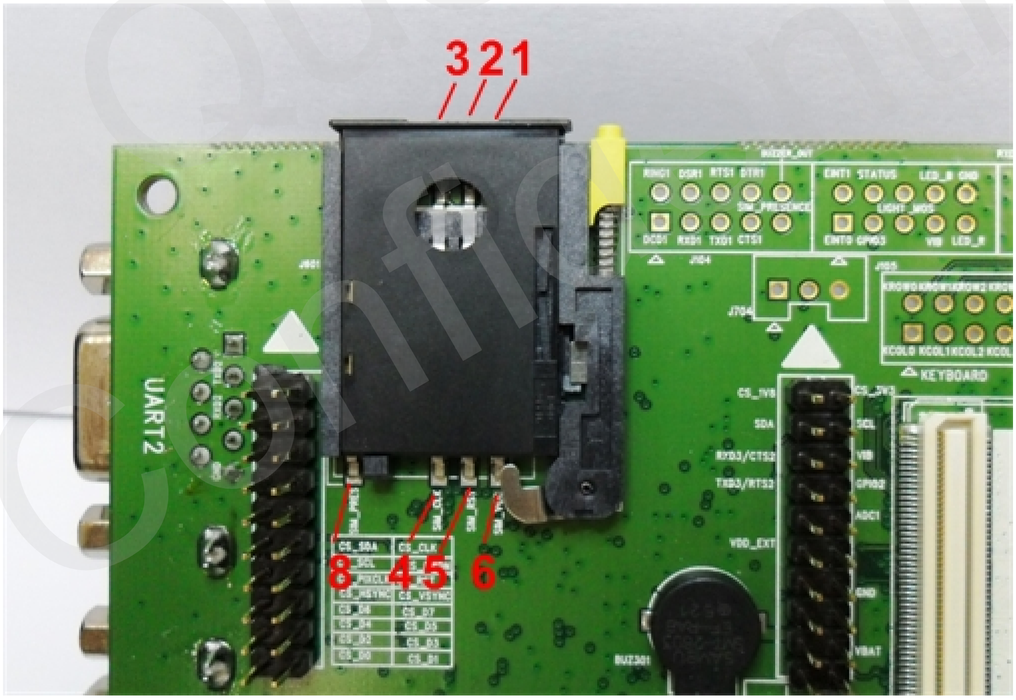


Figure 8: SIM card interface

Table 5: Pins of SIM card interface

Pin	Signal	I/O	Description
1	SIM_GND		GND, dedicated for SIM card

2	RESERVE		
3	SIM_IO	I/O	SIM card data I/O
4	SIM_CLK	O	SIM card clock
5	SIM_RST	O	SIM card reset
6	SIM_VDD	O	SIM card power output
8	SIM_PRESENCE	I	SIM card detection

3.4. Antenna Interface



Figure 9: RF interface

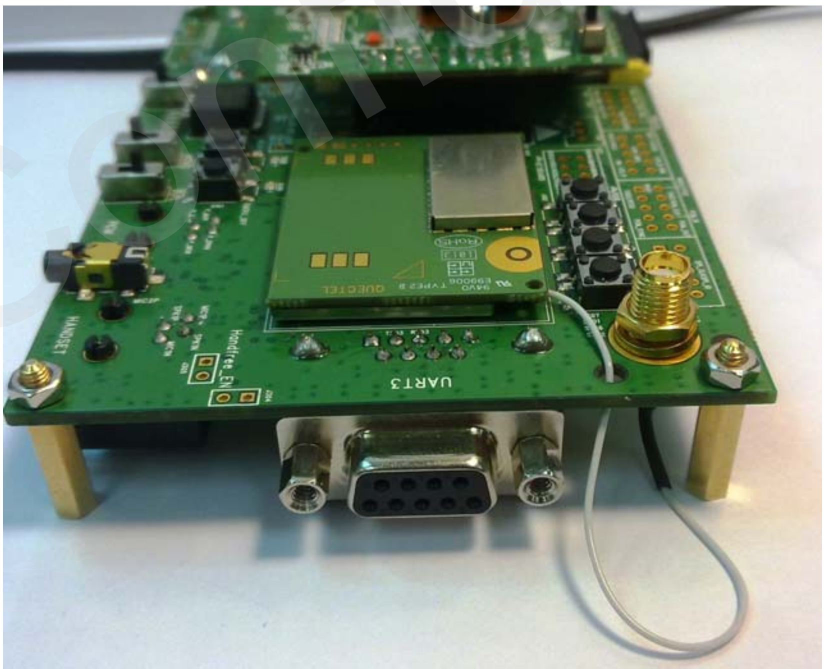


Figure 10: Antenna installation

3.5. Serial Ports

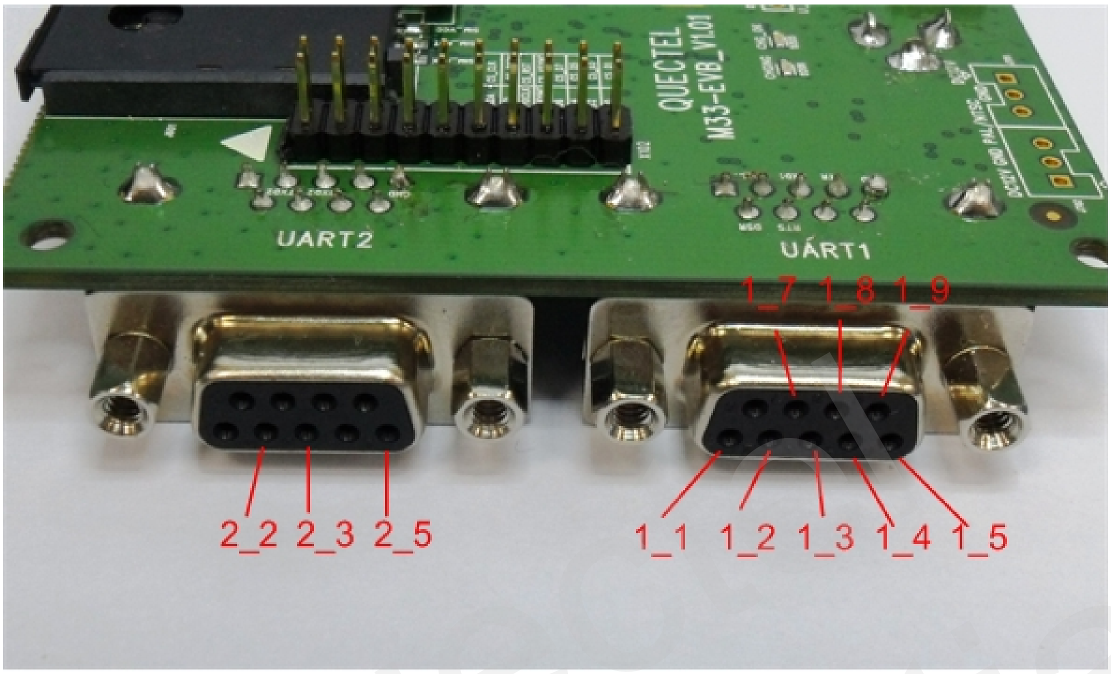


Figure 11: Serial Port 1& Serial Port 2

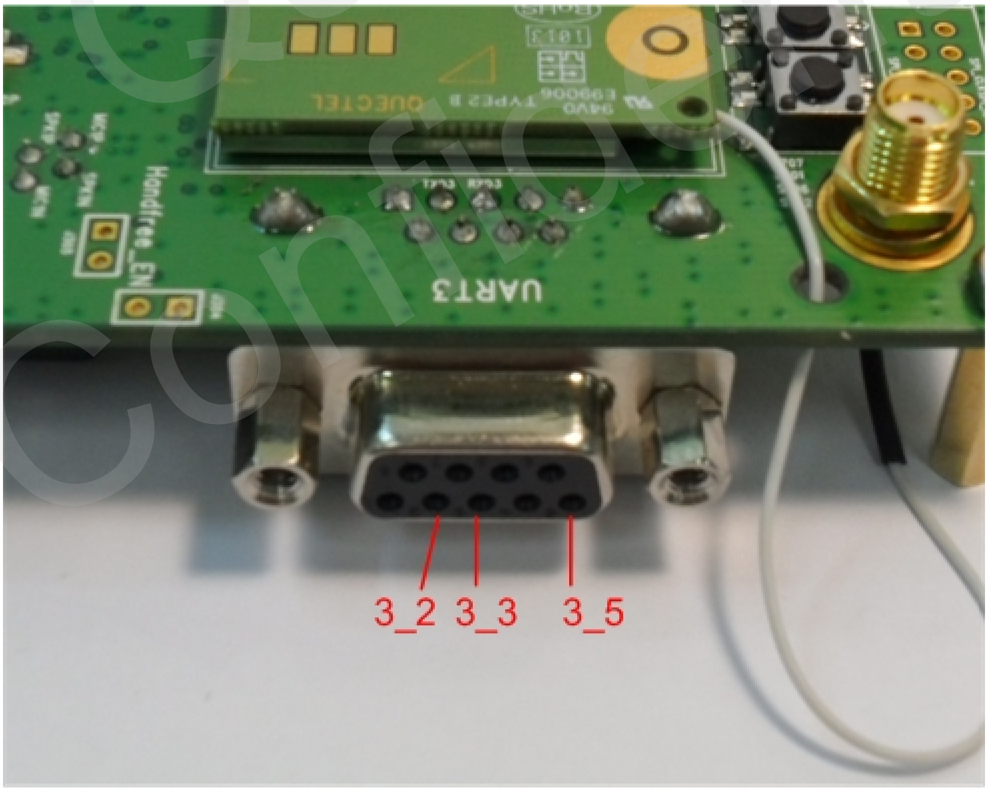


Figure 12: Serial Port 3

Table 6: Pins of Serial Port 1

Pin	Signal	I/O	Description
1_1	RS232_DCD1	O	Data carrier detection
1_2	RS232_TXD1	O	Transmit data
1_3	RS232_RXD1	I	Receive data
1_4	RS232_DTR1	I	Data terminal ready
1_5	GND		GND
1_7	RS232_RTS1	I	Request to send
1_8	RS232_CTS1	O	Clear to send
1_9	RS232_RI1	O	Ring indicator

Note: The voltage level of the module's Serial Ports signals has been shifted to RS-232 level, so it can be directly connect to PC by USB to UART converter cable.
Serial Port 1 is used for AT command, GPRS data, CSD FAX, multiplexing function and firmware upgrade.

Table 7: Pins of Serial Port 2

Pin	Signal	I/O	Description
2_2	RS232_TXD2	O	Transmit data
2_3	RS232_RXD2	I	Receive data
2_5	GND		GND

Note: Customer can debug software through Serial Port 2, which is not for AT command, GPRS service, CSD call or FAX call.

Table 8: Pins of Serial Port 3

Pin	Signal	I/O	Description
3_2	RS232_TXD3	O	Transmit data
3_3	RS232_RXD3	I	Receive data
3_5	GND		GND

Note: This port is designed for AT command only.

3.6. Switches and Buttons

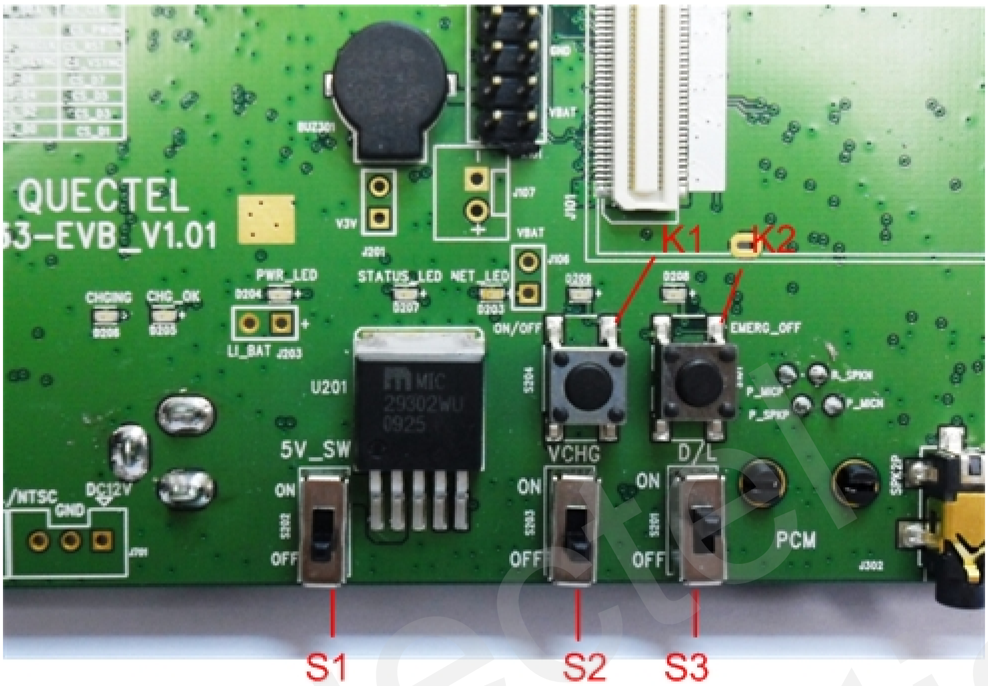


Figure 13: Switches and buttons

Table 9: Switches and buttons

Part	Name	I/O	Description
S1	5V_ ON/OFF switch	I	Switch on/off the power supply from the power adaptor
S2	VCHG	I	Control charge to a Li-ion or Li Polymer battery by the module.
S3	D/L	I	Place to ON when downloading firmware
K1	ON/OFF	I	Press this button for 2 seconds to turn on/off the module
K2	EMERG_OFF	I	Shutdown the module in case of emergency. Hardware power off operation. Press this button will immediately turn off the module.

3.7. Operating Status LED

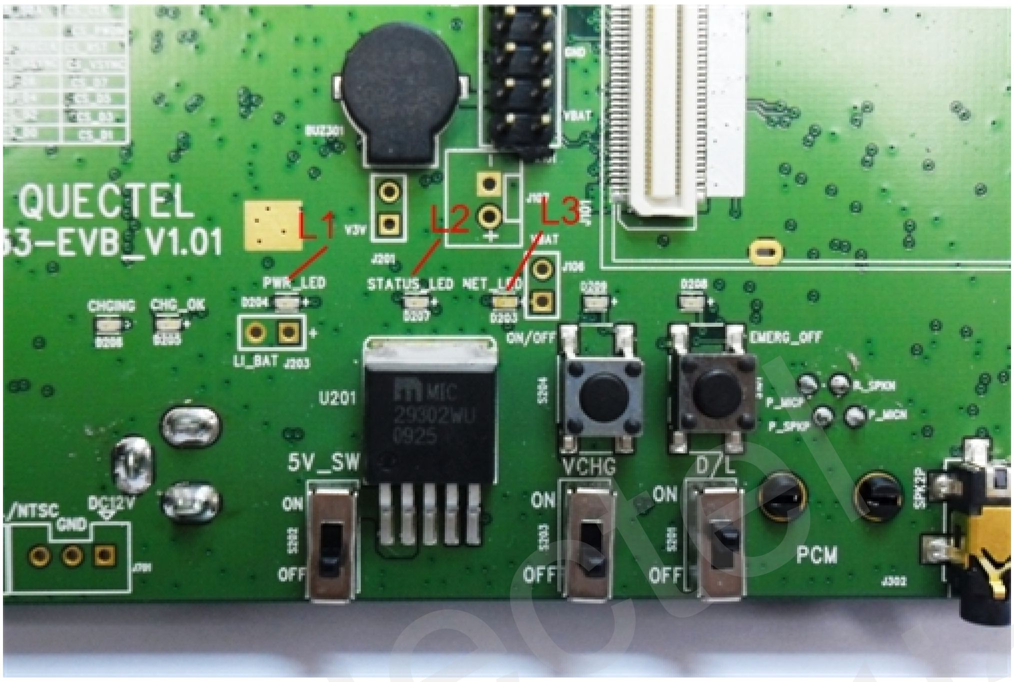


Figure 14: Operating status indication LEDs

Table 10: Operating status indication LEDs

Part	Name	I/O	Description
L1	5V ON/OFF indicator	O	On: VBAT ON Off: VBAT OFF
L2	Module Status indicator	O	On: module in power-on Off: module in power-off
L3	GSM_NET status indicator	O	Blinking differently to indicate various GSM network status

3.8. Test Points

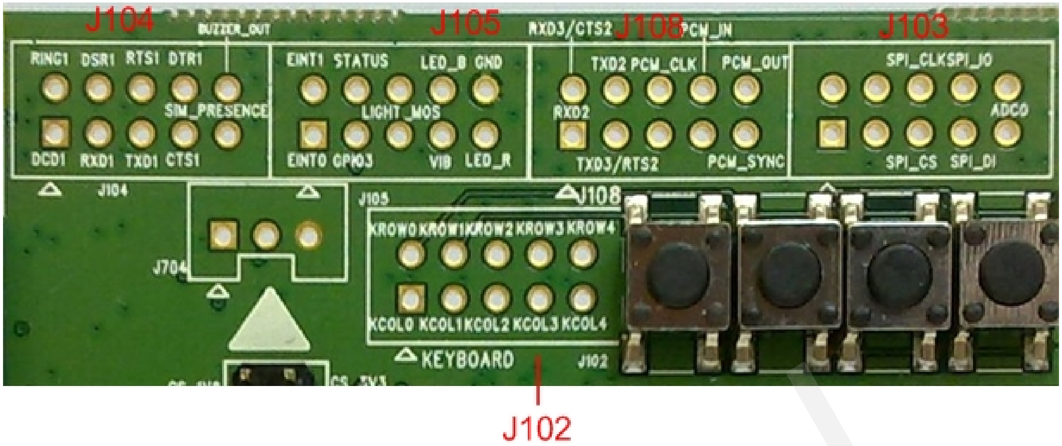


Figure 15: Test points overview

3.8.1 J104 Test Points



Figure 16: J104 test points

Table 11: Pins of J104

Pin	Signal	I/O	Description
1	DCD1	O	Data carrier detection of Serial Port 1
2	RI1	O	Ring indicator of Serial Port 1
3	RXD1	I	Receive data of Serial Port 1
4	DSR1	O	Data set ready of Serial Port 1
5	TXD1	O	Transmit data of Serial Port 1
6	RTS1	I	Request to send of Serial Port1
7	CTS1	O	Clear to send of Serial Port 1
8	DTR1	I	Data terminal ready of Serial Port 1
9	SIM_PRESENCE	I	SIM card detection. Pulled down internally.
10	BUZZER_OUT	O	Open drain output. Use to drive buzzer.

3.8.2 J105 Test Points

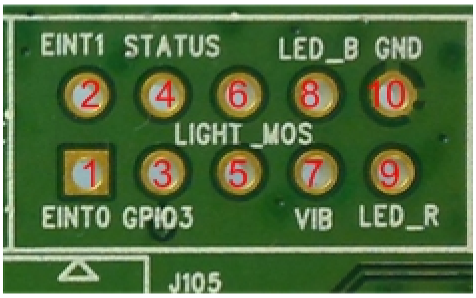


Figure 17: J105 test points

Table 12: Pins of J105

Pin	Signal	I/O	Description
1	EINT0	I	External interrupt input 0
2	EINT1	I	External interrupt input 1
3	RESERVE		
4	STATUS	O	Indicate module status. High level indicates module power-on and low level indicates power-down.
5	LIGHT_MOS	O	Open drain output port
6	RESERVE		
7	VIB	O	
8	LED_B	O	Open drain output port
9	LED_R	O	
10	GND		

3.8.3 J102 Test Points



Figure 18: J102 test points

Table 13: Pins of J102

Pin	Signal	I/O	Description
1	KCOL0	I	Keypad interface
2	KROW0	O	
3	KCOL1	I	
4	KROW1	O	
5	KCOL2	I	
6	KROW2	O	
7	KCOL3	I	
8	KROW3	O	
9	KCOL4	I	
10	KROW4	O	

3.8.4 J108 Test Points



Figure 19: J108 test points

Table 14: Pins of J108

Pin	Signal	I/O	Description
1	RXD2	I	Receive data of Serial Port 2
2	RXD3	I	Receive data of Serial Port 3
3	TXD3	O	Transmit data of Serial Port 3
4	TXD2	O	Transmit data of Serial Port 2
5	RESERVE		
6	PCM_CLK	O	Serial bit clock of PCM interface
7	RESERVE		
8	PCM_IN	I	Digital audio data input of PCM interface
9	PCM_SYNC	O	Frame synchronization of PCM interface
10	PCM_OUT	O	Digital audio data output of PCM interface

3.8.5 J103 Test Points



Figure 20: J103 test points

Table 15: Pins of J103

Pin	Signal	I/O	Description
1	RESERVE		
2			
3			
4			
5	SPI_CS	O	Chip select of SD interface
6	SPI_CLK	O	Serial clock of SD interface
7	SPI_I	I	Data input of SD interface
8	SPI_O	O	Data output of SD interface
9	ADC0	I	ADC input channel 0
10	RESERVE		

3.8.6 VDD_EXT and VBAT Test points

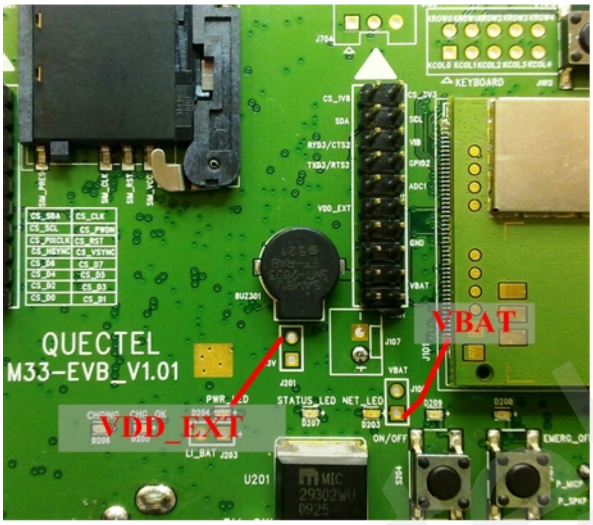


Figure 21: VDD_EXT and VBAT test points

Table 16: Pins of VBAT,VDD_EXT test points

NET NAME	Description
VBAT	VBAT is the power supply of module
VDD_EXT	Supply 2.8V voltage for external circuit.

Note: Customer can test two test points to judge whether the power supply to the module or the VDD_EXT voltage from the module is correct or not.

3.8.7 EVB_TE Board Interface

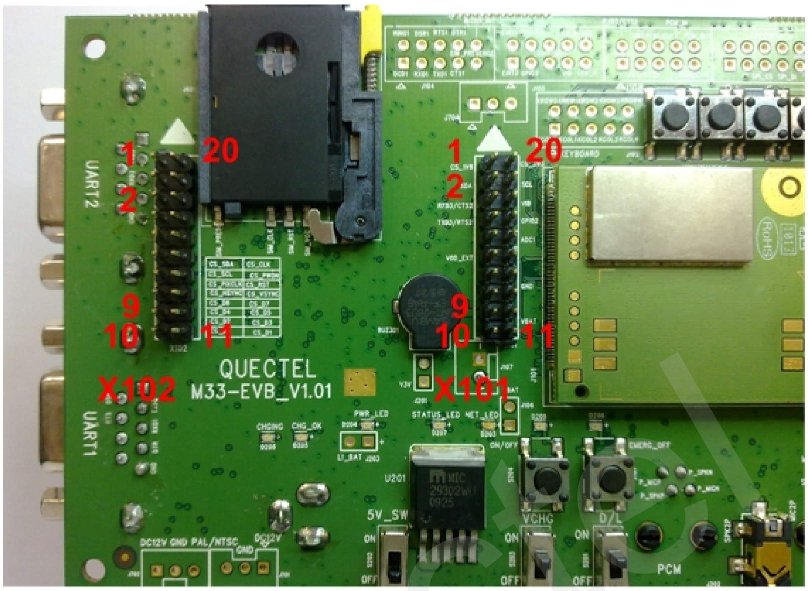


Figure 22: EVB_TE Board Interface

Table 17: Pins of TE Board interface X101

Pin	Signal	I/O	Description
1	RESERVE		
2	SDA	I/O	I2C serial data
3	RXD3	I	Receives data of Serial Port 3
4	TXD3	O	Transmit data of Serial Port 3
5	RESERVE		
6	VDD_EXT	O	Supply 2.8V voltage for external circuit.
7	GND		
8			
9	VBAT	I	Power Input
10			
11			
12			
13	GND		
14			
15	NETLIGHT_OUT	O	Network status indication light driver
16	ADC1	I	ADC input Chanel 1
17	RESERVE		
18	VIB	O	Open drain output port
19	SCL	O	I2C serial clock
20	RESERVE		

Table 18: Pins of TE Board interface X102

Pin	Signal	I/O	Description
1	RESERVE		
2	RESERVE		
3	CS_SDA	I/O	I2C serial data of camera interface
4	CS_SCL	O	I2C serial clock of camera interface
5	CS_PIXCLK	I	Pixel clock input
6	CS_HSYNC	I	Horizontal synchronizing
7	CS_D6	I	YUV video data bus input
8	CS_D4		
9	CS_D2		
10	CS_D0		
11	CS_D1		
12	CS_D3		
13	CS_D5		
14	CS_D7		
15	CS_VSYNC	I	Vertical synchronizing
16	CS_RESET	O	Reset camera module
17	CS_PWDN	O	Power down mode control
18	CS_ECLK	O	Clock output
19	RESERVE		
20	RESERVE		

Note: Both the EVB board and the EVB_TE board have assembly indication mark. Please install them in right direction.

4. EVB and Accessories

The EVB and its accessories are shown as Figure 23.



Figure 23: EVB and accessories

(1) Connect the RF cable to the RF connector of the module.
(2) Assembly the M33 module to the 100-pin connector on the M33 EVB.
(3) Fix the SMA connector of the RF cable in the connector fixing hole.
(4) Assembly SIM card to SIM card socket
(5) Assembly the M33_EVB_TE board on the M33 EVB. (Refer to Figure 24 for details)
(6) Connect Serial Port 1 on EVB to PC's USB port with the USB to UART converter cable.
(7) Insert headset into J302 connector
(8) Insert AC adaptor into J202 connector

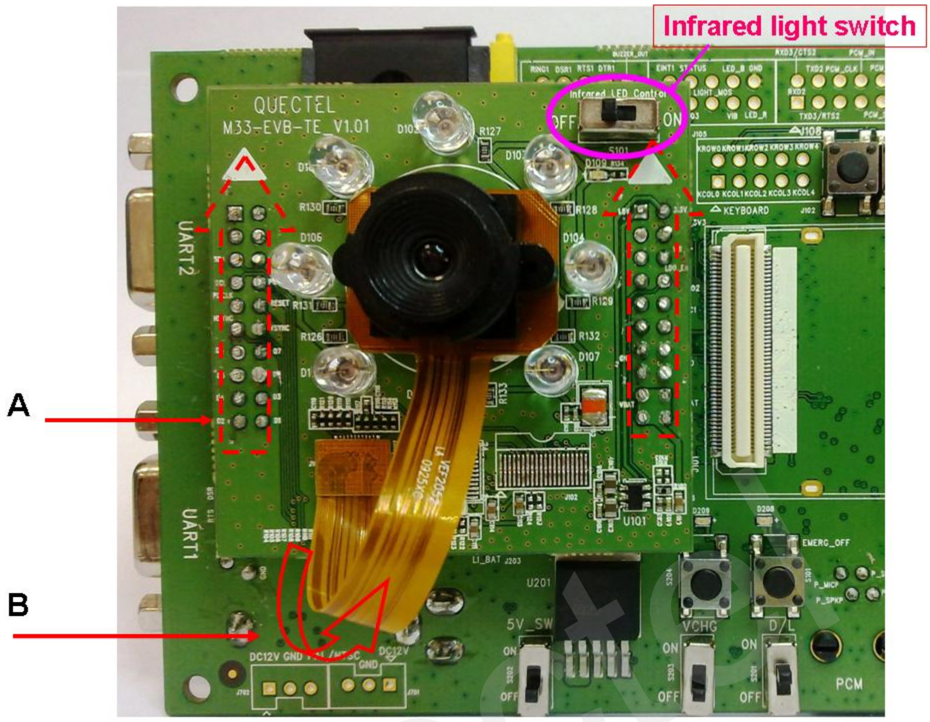


Figure 24: EVB_TE Board accessories assembly

A. X101 and X102 connectors of M33_EVB_TE board mark the direction of assembly. Install as instructed by Figure 24.

B. The FPC cable of the camera module must be assembled in the way shown in Figure 24.

5. Illustration

5.1. Power on Operations

(1) Assembly the M33 module to the 100-pin connector on the M33 EVB. Put Switch S1 to ON state. Put Switch S2 to OFF position and Switch S3 to OFF position. Plug in 5V DC adapter. The LED L1 on the EVB will go bright.
(2) Press the ON/OFF button for more than 2 seconds. When the STATUS_LED is lightened, and NET_LED is blinked , the module is working fine.

5.2. Communicate with the Module

(1) Connect the Serial Port 1 on EVB to PC's USB port with the USB to UART converter cable.
(2) Open the HyperTerminal (AT command window) in the PC. The location of the HyperTerminal in Windows XP is START →program →accessory →communication →HyperTerminal. Set appropriate Baud Rate (such as 115200 bps) and COM port number which can be checked by the Device Manager in the PC.
(3) Connect an antenna to the M33 with an RF cable.
(4) Insert SIM card into the SIM card socket.
(5) Insert earphone or handset into audio interface.
(6) Power on the module by pressing the ON/OFF button.
(7) After waiting for 2~3 seconds, customer should firstly input "AT" or "at" string once or more until receiving "OK" from the module in the HyperTerminal.
The module is set to autobauding mode in default configuration. This operation is to synchronize the baud rate between the computer and the module.
(8) Input AT command and the module will execute its corresponding function.
Customer can refer to *Document [1]* for details of AT commands. For instance, typing "ATD112;" makes a call to the emergency number 112.

5.3. Use Camera Function of the Module

(1) Before powering on the module, assemble M33_EVB_TE board to M33_EVB board, and put camera module onto M33_EVB_TE board.
(2) Power on the module by pressing the ON/OFF button.
(3) Sending "AT+QCAMSEL="OV7725"" and "AT+QCAMON" can drive the module enter camera standby mode.
(4) Sending "AT+QCAMSOT", "AT+QCAMMSOT" or "AT+QCAMAVI" can take photo and video.
(5) M33_EVB_TE Board comes with a bunch of infrared LEDs around the Camera. These can be used to emit infrared light for object in dark environment. Customer can manually set the Infrared Lights Switch (refer to Figure 24.) to ON or OFF state.

Refer to Document [5] for more details of camera AT commands.

5.4. Firmware Upgrade

(1) Start the Firmware Upgrade Tool in PC.
(2) Press the START button in the Firmware Upgrade Tool.
(3) Switch the S3 and S1 in the EVB to ON state as shown in Figure 25.
After these steps, the firmware refreshing process will be proceeding. For more details, please refer to *Document [4]*.

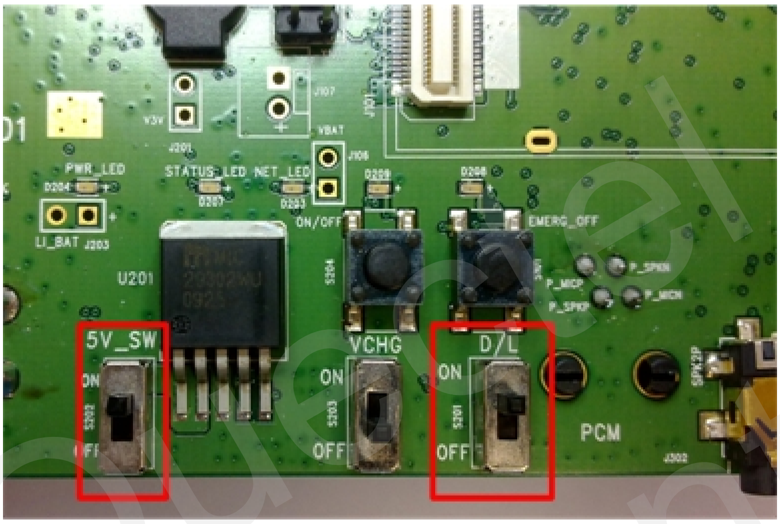


Figure 25: Switches state for firmware upgrade

5.5. Turn off

Pressing the ON/OFF button for 2 seconds will turn off the module.

5.6. Emergency off

Pressing the EMERG_OFF button for more than 20 milliseconds will shutdown the module immediately. After this operation, the module can be restarted by pressing the ON/OFF button. Please note that the operation is harmful to the whole module system and should only be done in emergency such as failing to turn off the module through the ON/OFF button.

6. 100 PIN Assignment of B2B Connector

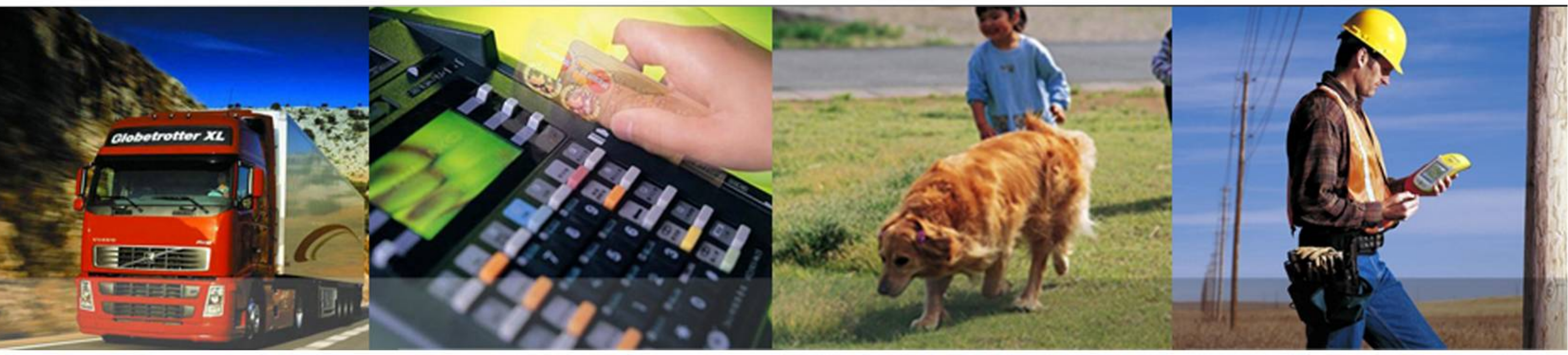


Figure 26: B2B connector of EVB

Table 19: Pin definition of B2B connector

PIN NO.	PIN NAME	I/O	PIN NO.	PIN NAME	I/O
1	VBAT	I	2	VBAT	I
3	VBAT	I	4	VBAT	I
5	VDD_EXT	O	6	VCHG	I
7	VRTC	I/O	8	VCHG	I
9	SIM_VDD	O	10	VDD_EXT	O
11	SIM_DATA	I/O	12	SIM_PRESENCE	I
13	SIM_RST	O	14	SIM_CLK	O
15	BUZZER_OUT	O	16	RESERVE	
17	NETLIGHT_OUT	O	18	EMERG_OFF	I
19	ON/OFF	I	20	ADC1	I
21	ADC0	I	22	SPI_CS	O
23	SPI_CLK	O	24	SPI_I	I
25	SPI_O	O	26	PCM_IN	I
27	PCM_SYNC	O	28	PCM_OUT	O
29	PCM_CLK	O	30	TXD2	O
31	RXD2	I	32	RXD3	I

33	TXD3	O		34	MIC2N	I
35	SPK1P	O		36	MIC2P	I
37	SPK1N	O		38	MIC1N	I
39	SPK2P	O		40	MIC1P	I
41	AGND			42	RESERVE	
43	RESERVE			44	SCL	O
45	STATUS	O		46	SDA	I/O
47	RESERVE			48	GPIO3	I/O
49	EINT1	I		50	EINT0	I
51	LIGHT_MOS	O		52	RESERVE	
53	LED_B	O		54	RESERVE	
55	RESERVE			56	RESERVE	
57	VIB	O		58	LED_R	O
59	KCOL0	I		60	KCOL1	I
61	KCOL2	I		62	KCOL3	I
63	KCOL4	I		64	KROW4	O
65	KROW3	O		66	KROW2	O
67	KROW1	O		68	KROW0	O
69	RI1	O		70	DCD1	O
71	RXD1	I		72	RTS1	I
73	TXD1	O		74	DSR1	O
75	CTS1	O		76	DTR1	I
77	CS_D0	I		78	CS_D1	I
79	CS_D2	I		80	CS_D3	I
81	CS_D4	I		82	CS_D5	I
83	CS_D6	I		84	CS_D7	I
85	CS_HSYNC	I		86	CS_VSYNC	I
87	CS_PIXCLK	I		88	CS_RESET	O
89	CS_SCL	O		90	CS_PWDN	O
91	CS_SDA	I/O		92	CS_ECLK	O
93	RESERVE			94	RESERVE	
95	GND			96	SIM_GND	
97	GND			98	GND	
99	GND			100	GND	



Quectel Wireless Solutions Co., Ltd.
Room 501, Building 9, No. 99, Tianzhou Road, Shanghai, China 200233
Tel: +86 21 5108 2965
Mail: info@quectel.com